

# Ageing and Heart Disease

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# Definition

- The World Health Organization (WHO) developed a definition of healthy ageing. It is the process of developing and maintaining the functional ability that enables wellbeing in older age.
- Functional ability:
  - To meet their basic needs
  - To learn, grow and make decisions
  - Mobility
  - Social interaction and contribution to society
- Frailty is theoretically defined as a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function:
  - low energy, slowed walking speed, low physical activity, and/or unintentional weight loss

# Ageing

- No one knows how and why people change as they get older
- Some theories claim that aging is caused by injuries from ultraviolet light over time, wear and tear on the body, or byproducts of metabolism.
- Genetics
- Aging is a complex process that varies as to how it affects different people and even different organs.
- Interaction of many lifelong influences, including heredity, environment, culture, diet, exercise and leisure, past illnesses, and many other factors.

# Decade of Healthy Ageing

- The UN declared 2021–30 as the [Decade of Healthy Ageing](#) with an aim to improve the health and wellbeing of older people
- **WHO's work on the UN Decade of Healthy Ageing (2021–2030)**
  - Abuse of older people.
  - Assistive technology.
  - Dementia.
  - Disability.
  - Falls.
  - Older people and COVID-19.
  - Palliative care.
  - Physical activity.

# Ten Determinants for Healthy Ageing

- Physical activity
- Diet
- Self-awareness
- Outlook/attitude
- Life-long learning
- Faith
- Social support
- Financial security
- Community engagement, and
- Independence.



- Unlike the changes of adolescence, which are predictable to within a few years, each person ages at a unique rate. Some systems begin aging as early as age 30. Other aging processes are not common until much later in life.
- Although some changes always occur with aging, they occur at different rates and to different extents. There is no way to predict exactly how you will age

- Genetic components of aging, disease and lifestyle, which presently remain largely unknown, likely complicate the picture further.
- During the past two decades, a sustained effort has been applied to characterize effects of aging on health in multiple aspects of cardiovascular structure and function in a single study population, the Baltimore Longitudinal Study on Aging (BLSA).



# Organs affected by Ageing

- Nervous system
- Senses: Eyes, ears, taste
- Musculoskeletal
- Lungs
- Heart



# Effects of Ageing on the Nervous System

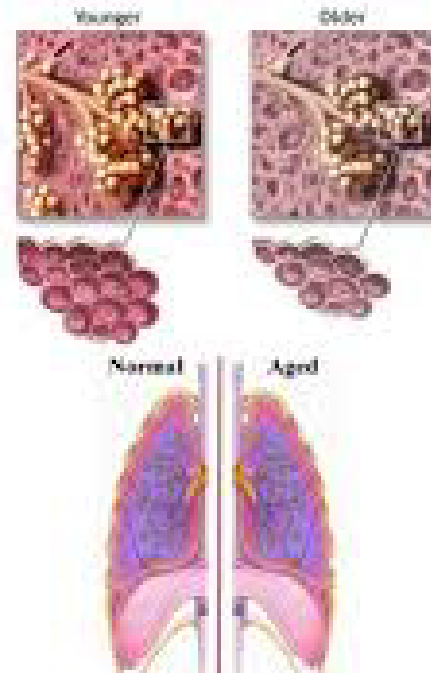
- As you age, your brain and nervous system go through natural changes.
  - Lose nerve cells and weight (atrophy).
  - Nerve cells may begin to pass messages more slowly than in the past.
  - Waste products or other chemicals such as beta amyloid can collect in the brain tissue as nerve cells break down. This can cause abnormal changes in the brain called plaques and tangles to form. A fatty brown pigment (Lipofuscin) can also build up in nerve tissue.
- Breakdown of nerves can affect your senses ( Hearing, sight, smell, taste).
- You might have reduced or lost reflexes or sensation.
- This leads to problems with movement and safety and makes it more likely to suffer falls.

# Mind

- Slowing of thought, memory, and thinking is a normal part of aging. These changes are not the same in everyone. Some people have many changes in their nerves and brain tissue. Others have few changes. These changes are not always related to the effects on your ability to think.
- Sleep disorders
- Loneliness and Depression
- Medications

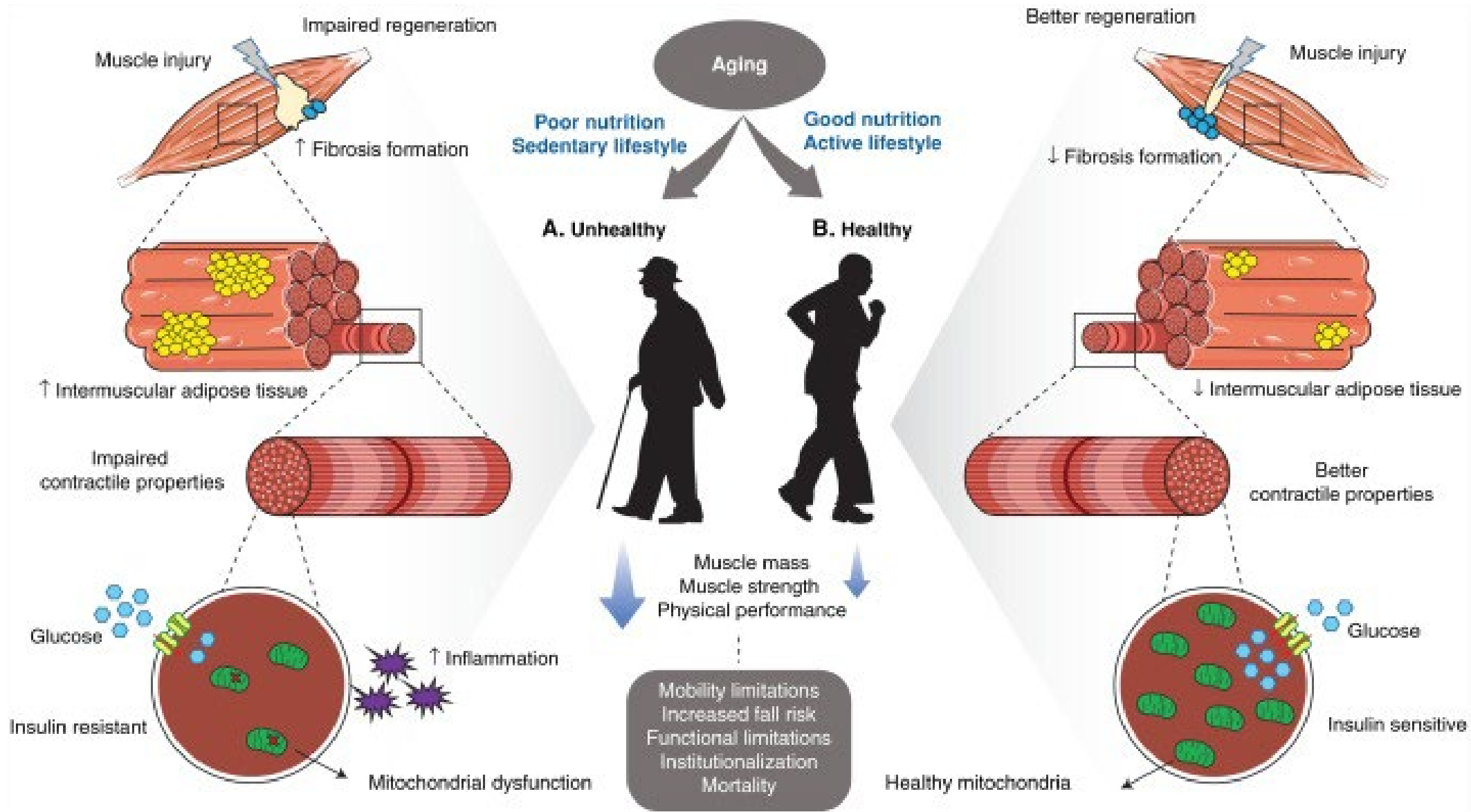
# Lungs

- ↓ Elasticity of lungs
- ↓ Vital capacity
- ↓ Blood oxygen levels
- ↓ Controlling effects of carbon dioxide
- ↑ Respiratory tract infection



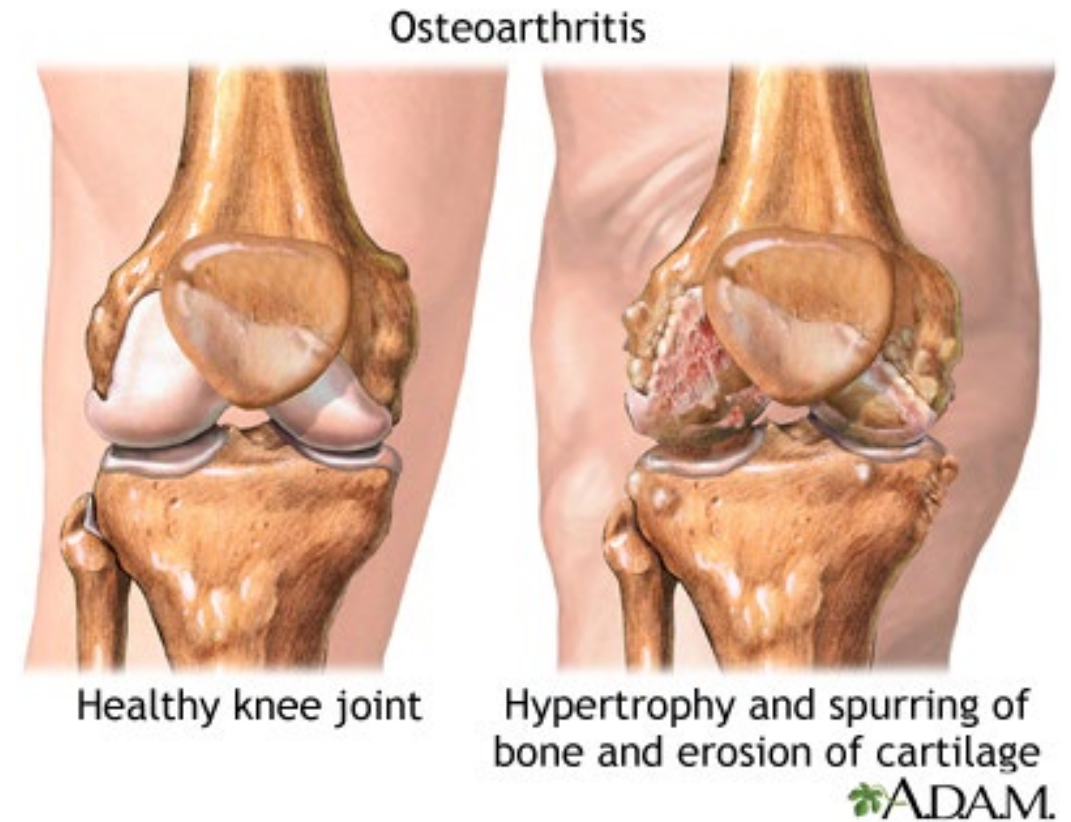
# Skeletal Muscle Ageing

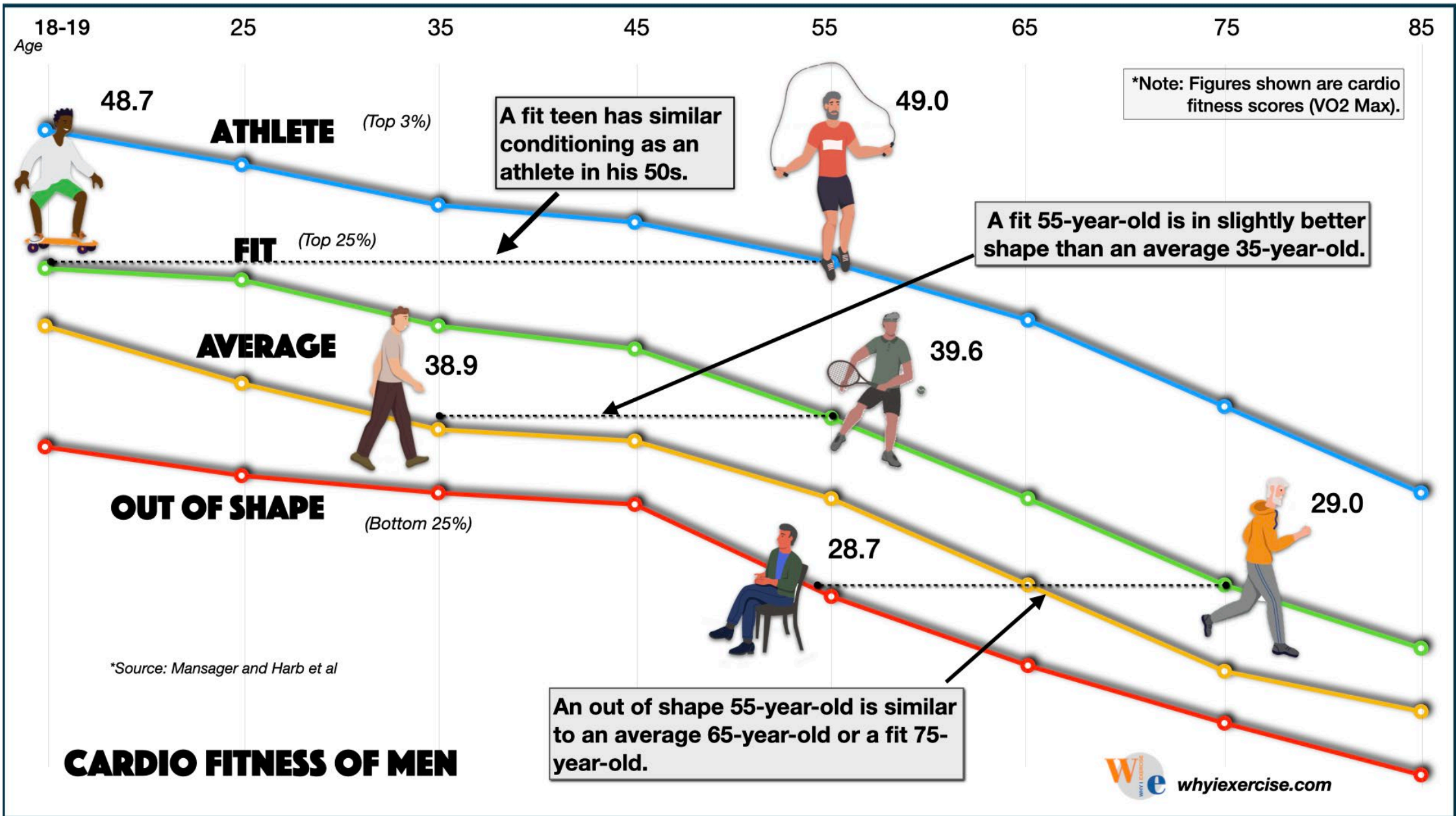
- A substantial loss of muscle mass and strength (sarcopenia)
  - Decreased regenerative capacity
  - Compromised physical performance
- 
- Healthy lifestyle and regular exercise delay muscle ageing



# Ageing and Joint Health

- People lose bone mass or density as they age, especially women after menopause. The bones lose calcium and other minerals.
- Spinal discs lose fluid, so curved and brittle
- The joints become stiffer and less flexible. Fluid in the joints may decrease.
- The cartilage may begin to rub together and wear away. Minerals may deposit in and around some joints (calcification).

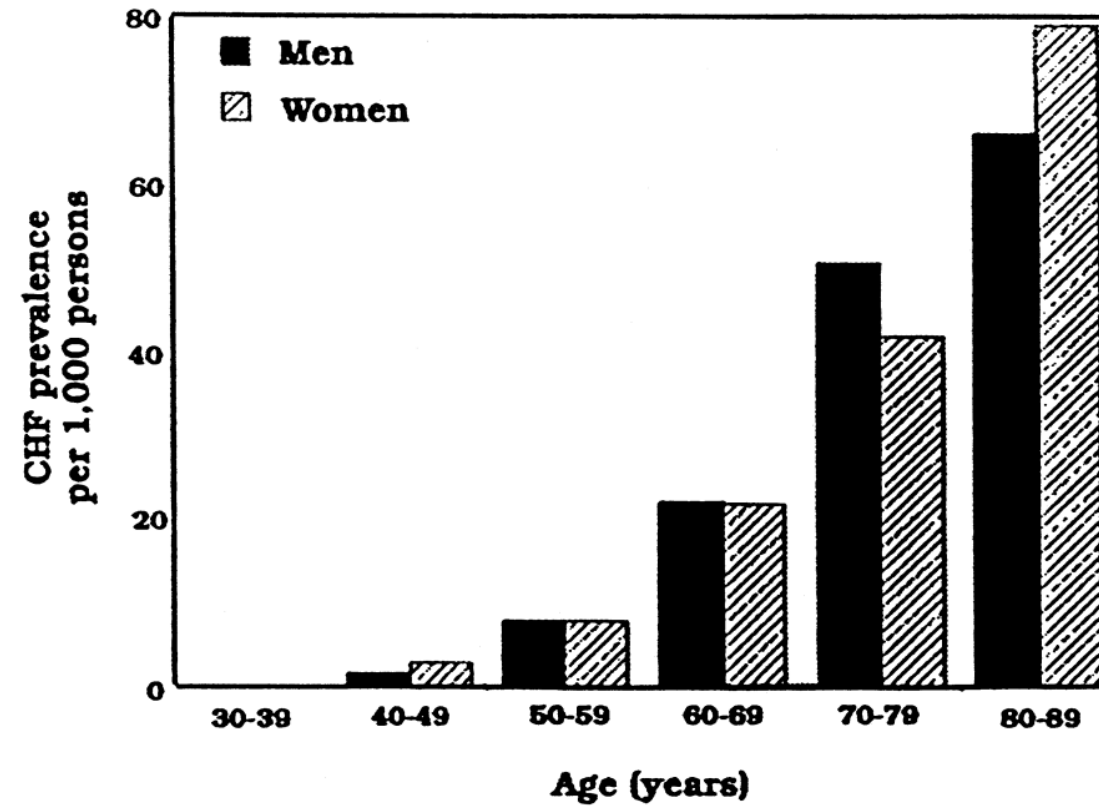




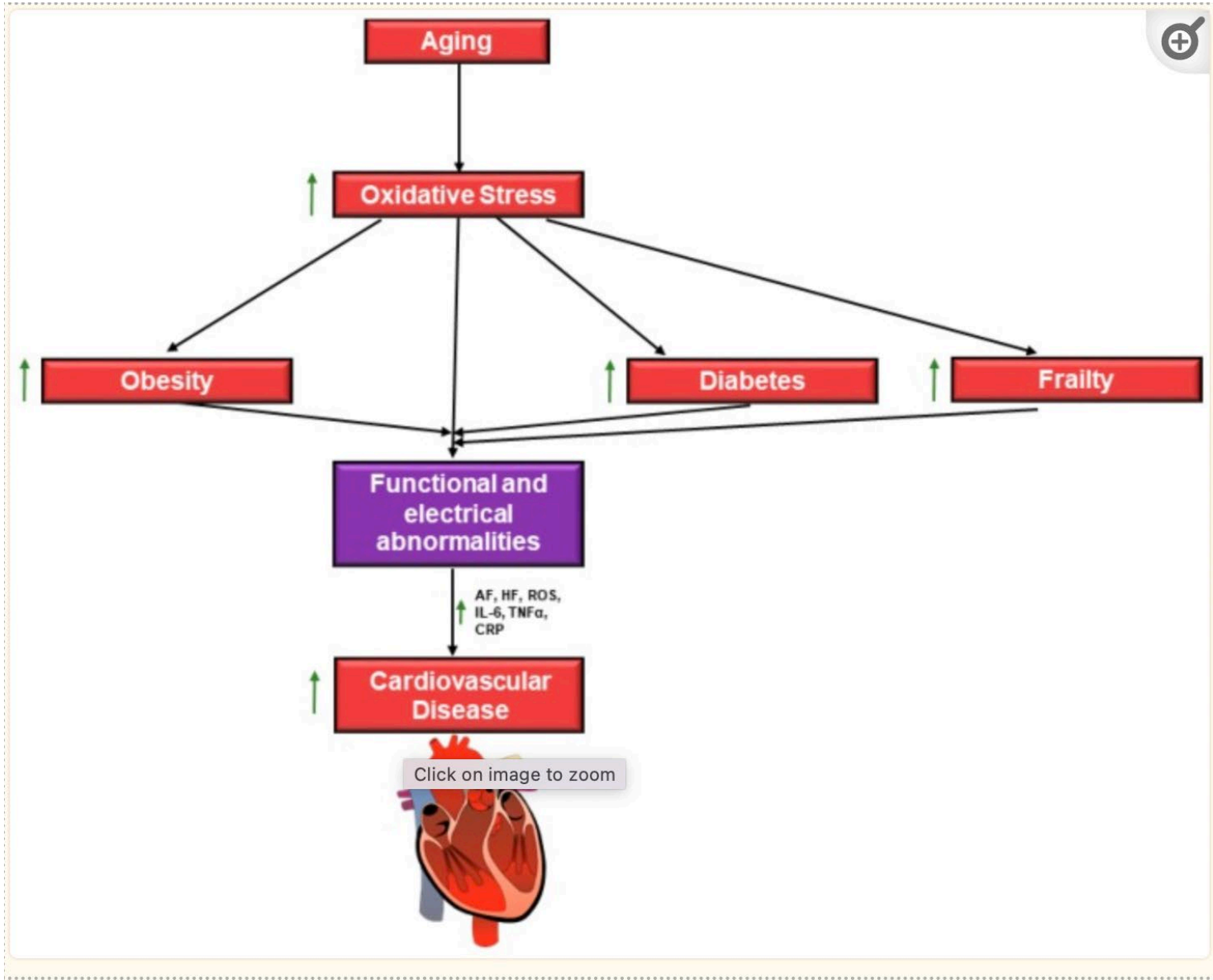


# Chronological Age and Changes in the Heart

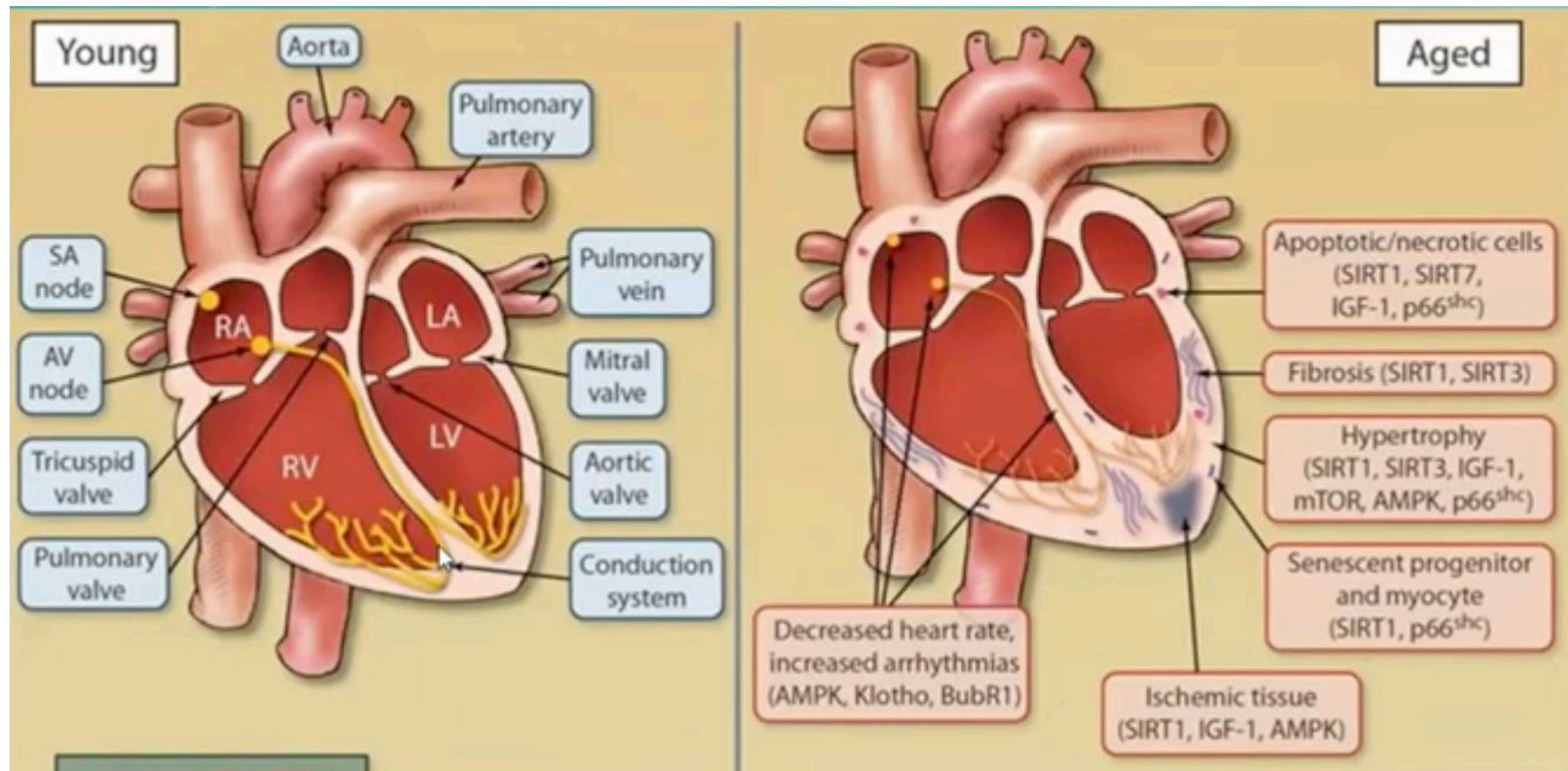
- Chronological age is identified as the major risk factor for cardiovascular morbidity and mortality
- The cardiovascular system undergoes structural and functional changes with age that compromise cardiac reserve.
- These age-associated cardiovascular changes lower the threshold for the three major cardiac pathophysiological conditions such as Left ventricular hypertrophy, chronic heart failure and atrial fibrillation, all seen with increasing age
- The prevalence of CVD has also been shown to increase with age, in both men and women, including the prevalence of atherosclerosis, stroke and myocardial infarction. The American Heart Association (AHA) reports that the incidence of CVD in US men and women is ~40% from 40–59 years, ~75% from 60–79 years, and ~86% in those above the age of 80



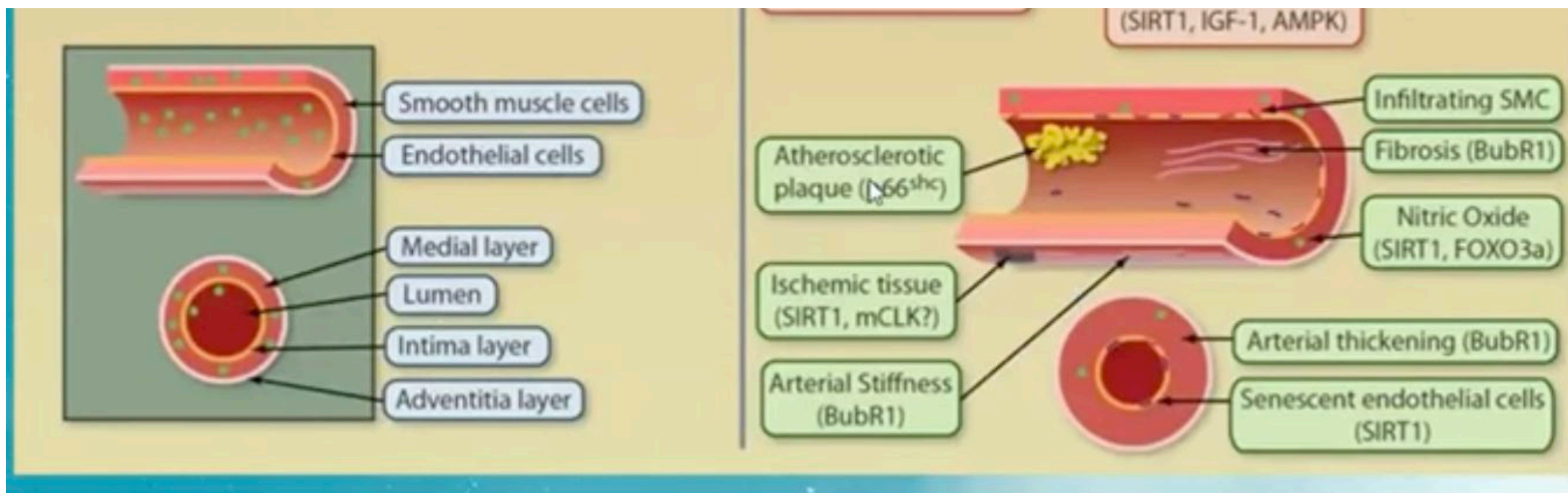
*Fig. 1. Average prevalence of heart failure according to age and sex: Framingham Heart Study, 16 year follow-up results [1].*



- The LV wall thickness increases with age and this is due largely to an increase in the size of cardiac myocytes accompanied by focal increase in collagen.
- Decrease in the efficacy of b-adrenergic modulation of both the heart and vasculature occurs with aging
- Reduction in the heart rate at rest in the sitting position, during routine activities of daily living and during exertion.
- The left atrial size also increases with aging in otherwise healthy persons



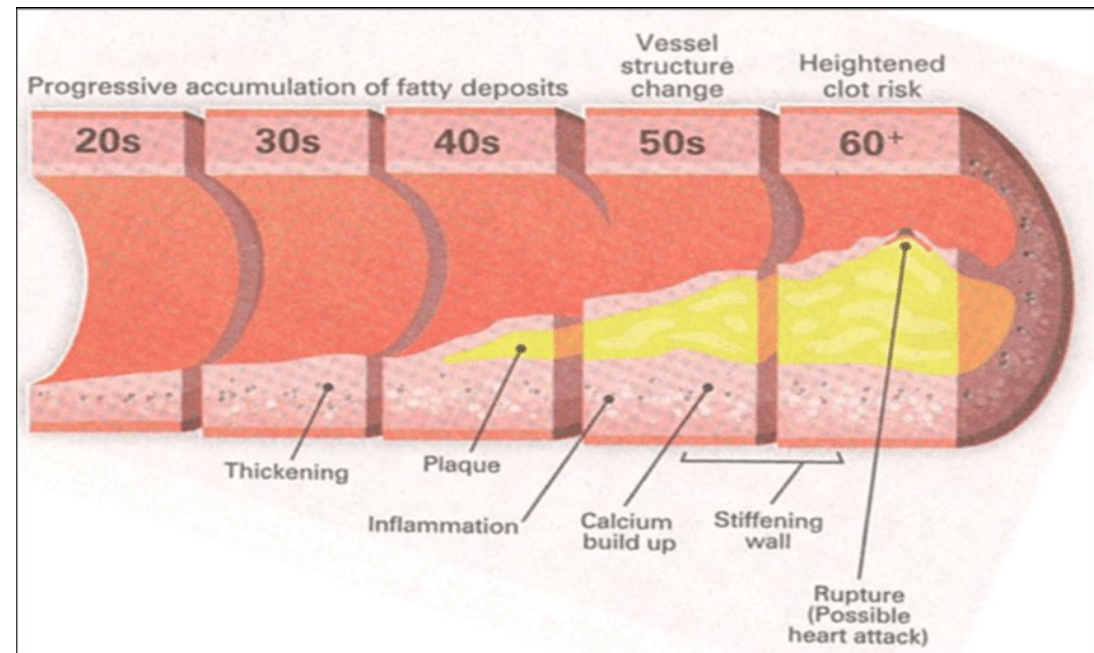
# Changes in the Vessel Wall



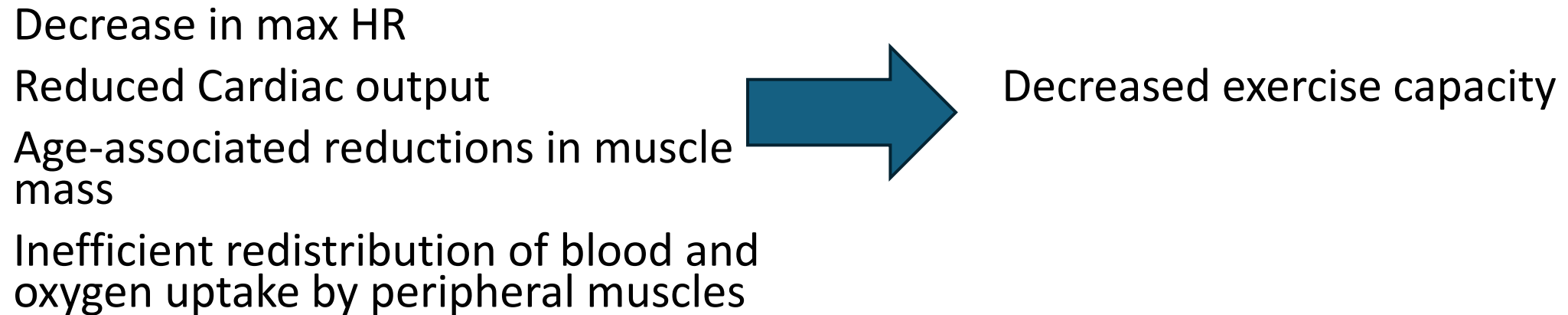


# Vascular Changes

- With advancing age, large arteries dilate, their walls, particularly the intima, become thickened and the media exhibits an increased collagen content and frayed elastin.

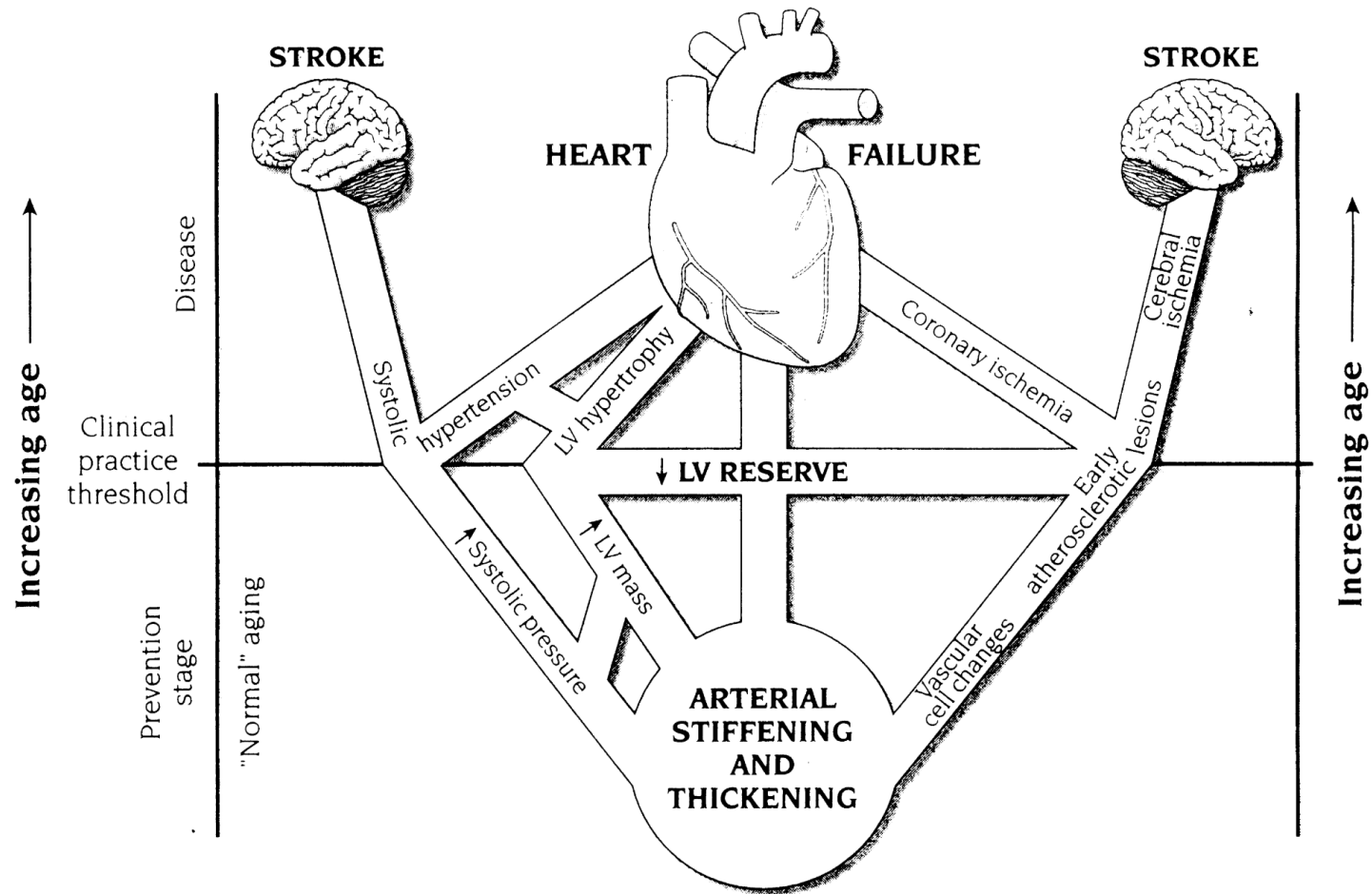


# Anatomic to Physiological Effects





## Aging: the major risk factor for cardiovascular morbidity and mortality



**Fig. 9.** Changes in the vasculature and heart with aging in health may also be construed as risk factors for cardiovascular disease, leading to heart and brain disorders in older age (see text for details, [70]).

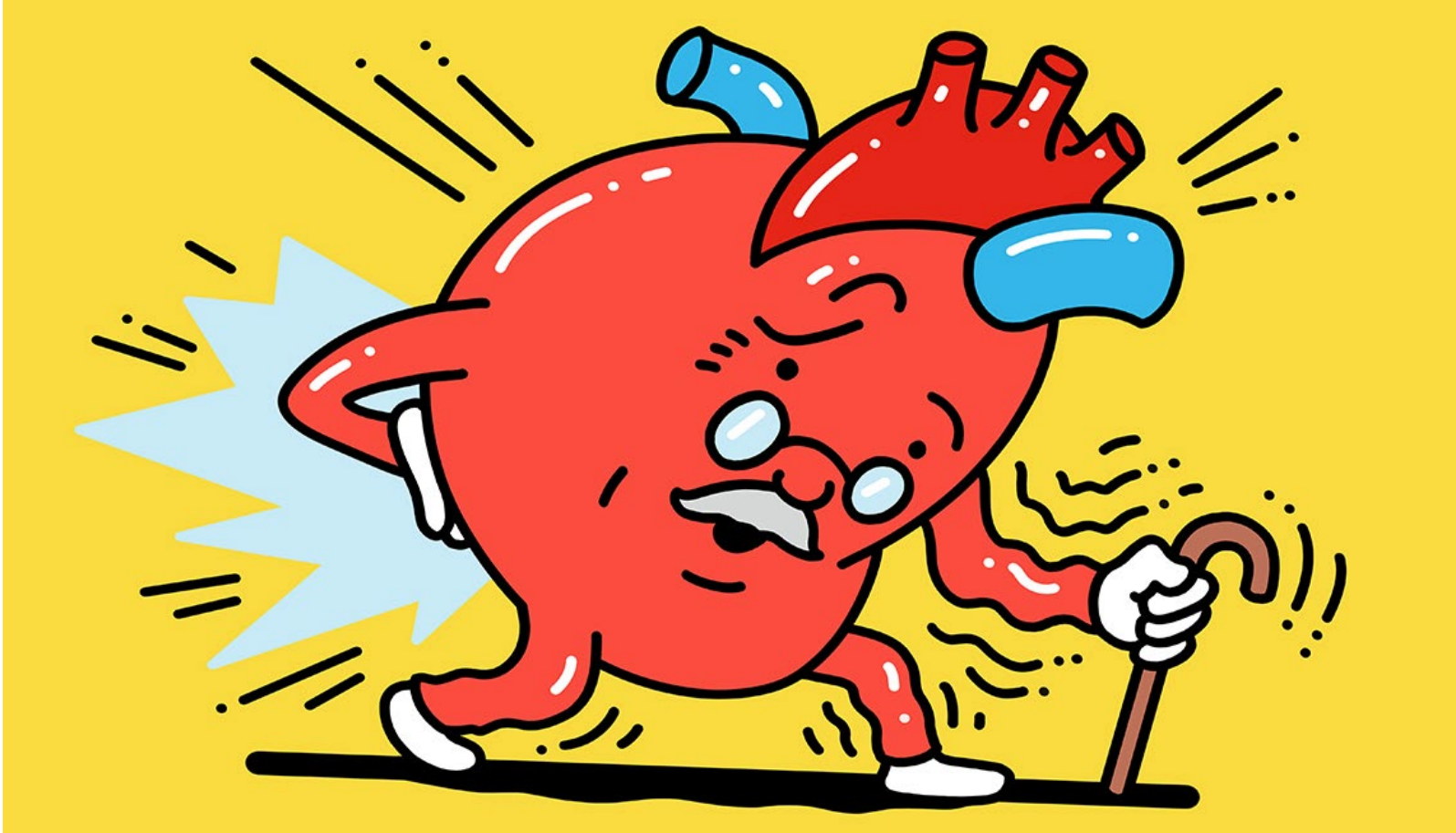
- Age is an independent risk factor for cardiovascular disease (CVD) in adults, but these risks are compounded by additional factors, including frailty, obesity, and diabetes and multiple comorbidities.
- These factors are known to complicate and enhance cardiac risk factors that are associated with the onset of advanced age.
- Sex is another potential risk factor in aging adults, given that older females are reported to be at a greater risk for CVD than age-matched men.

# Impact of Estrogen on CVD

- Estrogen has been shown to exert a cardioprotective effect in males as well.
- One study reported that males are likely to develop heart disease 10–15 years earlier than women due to the gradual decline in estrogen levels after puberty.
- Accumulation of visceral fat in women after menopause has been linked to hormonal changes, such as decreased estrogen, which result in an increased risk of metabolic syndrome and cardiovascular complications in obese postmenopausal women
- It has been reported that the risk for CVD increases dramatically in women at the onset of menopause, by as much as 2–4 times
- In addition to increased risk for CVD, women at menopause are also at a greater risk for high LDL cholesterol levels, hypertension, diabetes, and obesity, which further elevates cardiovascular risk factors in both perimenopausal and postmenopausal women

# Impact of Testosterone on Ageing Men

- Low testosterone was also shown to be independently associated with a high risk for acute MI in type 2 diabetic males, and a high incidence of coronary artery disease (CAD) in men.
- In older men, low testosterone levels have been linked to a higher risk for stroke.
- Despite the potential benefits of hormone replacement therapy in older men, the US Endocrine Society does not currently recommend testosterone therapy in asymptomatic older men (>65 years), particularly as an “anti-aging” treatment, due to the lack of complete evidence



# Frailty and Heart Disease

- Another important risk factor associated with the development and manifestation of CVD among the elderly, is the onset of frailty
- Among men and women aged 65 years and over, the presence of significant frailty has been shown to accurately predict incident CVD
- Frailty is known to be a direct consequence of weakened physiological reserve, which results in a heightened vulnerability towards either acute or chronic illness
- Decreased walking speed, exhaustion, inactivity, muscle wasting and weakness

# Management of Heart Disease in Elderly

- While age is shown to be independently associated with inflammation and a risk for CVD, health behaviors may also complicate these factors.
- lifestyle modifications are a key to promoting better health in aging adults, and are a fundamental approach to reducing cardiovascular risk in adults
- Examples of lifestyle changes that have been directly linked to decreased risk of CVD include maintenance of a healthy weight, avoidance of tobacco products, and regular exercise

# Summary: Decline in Functional Status

- Sensory aids
- Neuromuscular coordination
- Musculoskeletal weakness
- Cardiac output and relaxation
- Comorbidities
- Medications and previous surgeries



# Management

- Regular moderate exercise
- Avoiding extreme temperatures
- Hydrate
- Postural changes and balance
- Avoid falls and injuries
- Pace yourself





Namaste

Thank you

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